

## Pasture Improvement with Legumes, Lake County, MT

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**Objective:** Increase legumes in pastures by interseeding

**County:** Lake County

**Average Annual Precipitation:** 14 - 19 inches

**MLRA:** 44A, Northern Rocky Mountain Valleys

**Dominant Soil Types:** McDonald cobbly silty clay loam and Post silty clay loam

**Elevation:** 3000 ft

**Site Preparation:** Heavy livestock grazing pressure on existing pasture plant species

**Seeding Date:** Feb 2015

**Seeding Method:** Broadcast seed at the standard rate and double the standard rate

**Acres Seeded:** Each species was seeded individually in 50 x 50 foot plots at the two rates. There were five sites all receiving the same seeding methods and rates.

**Previous Site History:** Sites are grass dominated pastures with some weeds present.

**Herbicide:** None applied

**Irrigation:** Sprinkler irrigated

**Grazing:** Cattle, sheep (one site), and wildlife

**Monitoring Dates:** Aug 2016, June 2018



Photo: USDA NRCS

**Fig. 1.** Red clover was a top performer in the broadcast interseeding trial.

### Introduction:

The field planting goal was to improve pastures by adding nitrogen-fixing legume species to existing pasture grasses. Legumes provide high quality forage for livestock. Broadcast seeding was tested as an inexpensive, easy method for interseeding legumes to improve pastures. Five legume species were seeded individually into 50 x 50 foot plots at two different seeding rates (Table 1). Prior to seeding, or immediately thereafter, each plot was heavily grazed by livestock. The heavy livestock pressure provided some soil disturbance which may have improved the seed-to-soil contact necessary for germination. Grazing may have also decreased existing grass competition in the short term to improve germination of seeded legumes.

**Table 1.** Seeded species and their seeding rate.

Common Name	Scientific Name	Cultivar	Single Rate (lbs PLS/acre)	Double Rate (lbs PLS/acre)
Alsike clover	<i>Trifolium hybridum</i>		4	8
Birdsfoot trefoil	<i>Lotus corniculatus</i>	Leo	3	6
Cicer milkvetch	<i>Astragalus cicer</i>		8	16
Red clover	<i>Trifolium pratense</i>	Common	4	8
Sainfoin	<i>Onobrychis viciifolia</i>		34	68

## Results:

Broadcast interseeding legumes in established pastures can be successful. Red clover successfully established on all sites where it was interseeded (Table 2). Alsike clover and birdsfoot trefoil also had good establishment success on the various sites. Three years after seeding, all species still had relatively low canopy cover in the pastures where they established, averaging  $\leq 6\%$ . Even though the canopy cover was low, alsike clover, red clover, and cicer milkvetch averaged about one plant per square foot. Over time, these species may increase in size to produce more biomass and cover. Sainfoin had low establishment success and trace canopy cover on sites; however, where it did establish it had a greater height than the other species.

**Table 2.** The 2018 species evaluation summary averaged for the sites where each species established.

Species	Percent of Sites Established	Density (plants/ft <sup>2</sup> )	Canopy Cover (%)	Height (inch)
Alsike clover	80%	0.9	5%	12
Birdsfoot trefoil	80%	0.4	3%	12
Cicer milkvetch	60%	1.1	6%	10
Red clover	100%	0.9	5%	11
Sainfoin	40%	0.4	1%	20

We consistently observed insect damage on alsike clover while the other species had none to minimal plant injury. Weedy species (plantain, oxeye daisy, Canada thistle) averaged 40% canopy cover in the interseeded pastures. Broadcast interseeding legumes into pasture may be improved with a pre-seeding weed treatment (grazing, non-residual herbicide, etc.).



**Fig 2.** Interseeded red clover mixed with grass in the foreground, June 2018.



**Fig 3.** Drill interseeded legumes, June 2017.

## Summary:

- Interseeding legumes was successful in sprinkler irrigated pastures.
- Red clover consistently established and had good density and canopy cover.
- Alsike clover also established well but had consistent insect damage in 2018.
- The double seed rate had only slightly higher legumes densities than the single rate.
- Although not presented, additional interseeding trials in the same pastures found drill seeding established more legume cover than broadcast seeding probably due to better seed-to-soil contact.